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ABSTRACT

This research paper generally relates psychology to teaching; specifically, behavior shaping to curriculum planning. Reports are cited that emphasize operant learning as a means of behavior modification. In this instance, the teacher provides a favorable learning situation and arranges environmental factors to increase or decrease the frequency of certain responses. Implementation of operant learning is achieved through programmed instruction. The principles of this instruction are as follows: a) reward as a motivation for learning, b) learning in small steps, c) active participation in learning, d) learning with few or no errors, and e) learning at one's own pace. Results are reported that reinforce the use of programmed instruction with mentally retarded andemotionally disturbed children. Recommendations for research design specifications are made. Five pages of references are included. (BRB)

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PSYCHOLOGY AND TEACHING:

BEHAVIOR SHAPING AND CURRICULUM

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Abstract

We teachers need help with teaching. This paper focuses on how psychology and behavior shaping can help. Studies are cited which illustrate some of the work being done. Since the middle 1960's much data have been presented in the professional journals documenting the efficacy of operant conditioning and learning in many areas of personal-social functioning. Review articles are cited, as well as cumulative sources. William James was avidly interested in the teaching-learning process, so is B. F. Skinner, and so should we be.

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Psychologists often forget that teaching is an art rather than a science. Educators often forget that teaching is based on science and not just art. And as William James (1899) said, "Psychology is a science, and teaching is an art; and sciences never generate arts directly out of themselves. An intermediary inventive mind must make the application, by using its originality."

The purpose of this paper is to relate psychology to teaching, generally, and to relate behavior shaping to curriculum, specifically. It may be said that many educators are not knowledgeable of and/or familiar with the current research. It may also be said that many psychologists are not knowledgeable of and/or familiar with the problems of teaching and curriculum. This paper will focus on newer methods for effectively shaping or modifying student behavior whether in terms of concept or control, whether in terms of subject matter or discipline.

Newman wrote a book entitled Psychological Consultation in the Schools: A Catalyst for Learning. She recommends a program "... calling for the consultant to be continuously present, on the spot, relating as occasion arises to all members of the institution (principals, teachers, children, parents), attending staff meetings, and even, sometimes, filling in as a substitute." This type of program would be advantageous if it would increase communication and increase self awareness of members. But consultation would be entirely an ancillary service; it would not be involved in suggesting or making decisions about policy or curriculum. Rather it would adhere to present policies to avoid pressuring or threatening, so as to make psychological consultation possible to all. Although increased communication is definitely needed,

unless critical re-evaluation of present curriculum policies is a subsequent action leading to change, this program is seriously lacking. Goodman (1968) described Newman's consultant as a "...catalyst for the smoother operation of the school," not a catalyst for learning.

W. I. Gardner (1967) has also considered what the role of the psychologist should be. He suggests the psychologist should act as a social learning consultant and educator in both the residential center and in the community. In order to accomplish this, Gardner advocates acceptance of the behavior modification model and rejection of the medical model. He also recommends less time and involvement in psychotherapy since some research has indicated it is of dubious value and involves a costly expense of time.

McConnell (1968) advocated behavioral therapies--because they 'work." 'They work better than any form of therapy ever devised in the past. That is, the behavioral therapies cure people, get people out of mental hospitals sooner and in larger numbers than any other type of therapy anyone has ever devised. Furthermore, as a number of studies show, far fewer patients cured with behavioral techniques become sick again than do patients who are treated with other types of therapy." He went on to say that the prime reason the new behavioral therapies 'work" is that "...they're based on scientific experimentation rather than the humanistic speculation that underlies most other forms of therapy."

The behavioral revolution in America began with E. L. Thorndike and J. B. Watson. Impetus was given to the behavioral approach, when B. F. Skinner began to describe in precise terms the factors that control an organism's behavior. Skinner's initial work and scientific principles

came from his work with lower animals. Of utmost importance when trying to shape an animal's behavior, is to describe in very concrete, mechanical terms just what it is you want the animal to accomplish. McConnell (1968) stated that "One of the reasons that our education of human beings has been such a dull and ineffectual process is that we never got around to describing in...detail just what terminal behavior patterns an educated person should show."

Thus, having viewed Newman's, M. I. Gardner's, and McConnell's opinions of what the psychologists' role should be, one can conclude it should not consider diagnostics alone. Rather, the psychologist should consider diagnostics in conjunction with treatment. Treatment is the key to further academic or social development of the individual, without it there is little, if any, progress. The psychologist should emphasize therapeutic and remedial programs for teachers to follow in the classroom; they should be concerned with methods for making children with specific problems learn and adjust more effectively.

As Oliver (1965, p. 6) said, 'We may tentatively consider as a synonym for 'curriculum' the term 'the educational program.' The educational program consists of three basic elements: (1) the program of studies, (2) the program of activities, (3) the program of guidance."

Johnson (1968) made a careful distinction between remedial and other teaching. "The former is 'clinical' and is not tutoring in school subjects, nor going back to the developmental level at which the child is presently functioning, nor reducing goals or rate of presentation, nor synonymous with multiple sensory stimulation which impedes learning in some cases, nor teaching to the strengths or assets with resultant

overcompensation, nor talking about feelings and inadequacies, nor finally, a method approach....The child with a learning disability needs special teaching. While the classroom teacher uses intact responses, the special teacher works with the area of deficit." Curriculum, of course, encompasses all kinds of teaching.

Curriculum specialists, counselors, school psychologists, and teachers ought to consider operant learning techniques when devising programs for individual students and groups of students. Operant learning, derived from the descriptive behaviorism of Skinner is a technique that can be applied directly to the development of adaptive behavior. The teacher provides a favorable learning environment and at the same time arranges environmental factors to increase or decrease the frequency of certain responses. Behavior can be modified--shaped by applying principles of operant learning. One may gain control over relatively complex behavioral sequences, not just control over simple responses.

Programmed instruction can be very useful in curriculum planning because it follows principles of operant learning. The main principles of programmed instruction are: 1) reward as a motivation for learning, 2) learning in small steps, 3) active participation in learning, 4) learning with few or no errors, and 5) learning at one's own pace.

Research has shown that reward can be more effective than punishment in teaching because the latter may have emotion-inducing side effects which can block or inhibit learning. In the case of reward, we find it to be more effective if it immediately follows the response and if it is selective (given only when the correct or desired response is emitted).

The most important feature of reward is that it has its greatest effectiveness when the reward for right responses is given at each small

step in the learning process. Learning is inefficient if each successive step is not mastered in turn--the material becomes confusing and aversive. In programmed instruction, a subject is broken down into many brief items. Each helps lead the student from the simple toward the complex, requiring him to lean more and more on what he learned as he goes along.

Active participation is more effective than passive reception. The student will learn faster and remember longer if he is personally making the responses involved in the step-by-step process, and is personally receiving reinforcement for right responses.

Learning with few or no errors is conducive to further learning. It has been shown that we learn better if we make few errors. Making mistakes is time consuming and frustrating to the student in the learning situation. When a student makes many mistakes it means that one step does not lead logically to the next step or the steps in the process may be too large. The learning situation may become punishing and aversive to the student who is making errors, which often results in a decline of natural motivation to learn.

Learning is best when a student proceeds at his own pace. In the classroom many students fall behind because they misunderstand a point. In programmed lerrning, the lesson proceeds only if the student has completed a step and understands it. This is good "theory." Levine (1963) aptly debated (for and against) programmed reading instruction. This is good "reality."

The principles of operant conditioning and behavior modification techniques have been applied to the mentally retarded. "The results of studies of the application of behavior modification techniques to the

mentally retarded have clearly established this method as a primary therapeutic tool" (J. M. Gardner, 1968). This is especially true, for the severely and profoundly retarded for whom traditional methods have been of little value. And of all curriculum "problems," severely and profoundly retarded students with their multiple sensory-motor handicaps are among the most difficult to reach.

Blackman and Capobianco (1965) reported that although no academic superiority was evidenced by their teaching machine, i.e.,programmed instruction groups (of retarded adolescents), greater improvement in deportment was shown by the latter groups as compared with the no-teaching machine groups studied. The latter investigator offers as a rationale for the significant improvement in the deportment of the experimental groups the possibility that "the teaching machine and its accompanying program.... may have operated to improve the classroom behaviors of the subjects....by reducing frustration and maximizing attention."

Hogel and Schiff (1967) extinguished a head-bumping symptom of eight years duration in two minutes by requiring the patient to perform the habit in the presence of the therapist, whose approval was highly important to the patient. Analogously, one could work with the student and teacher.

Girardeau and Spradlin (1964) showed how a program based on positive reinforcement was established to manage and train moderately and severely retarded girls in a residential center. Tokens were established as generalized reinforcers by making them redeemable in food, soft drinks, jewelry, clothing and novelties. These tokens were delivered to the children whenever they were engaged in constructive socially acceptable

activities. Results indicated socially acceptable behavior appeared to increase in frequency.

Also, Fuller (1949) trained a bedridden 18-year-old "vegetative idiot" to move his arm to earn a food reward. "Psychotic and mentally retarded children have been successfully treated for poverty in generalized imitation tendencies (Metz, 1965), self-help behavior (Bensberg, Colwell & Cassel, 1965) and speech deficiency (Commons, Paul & Fargo, 1966; Cook & Adams, 1966; Kerr, Meyerson & Michael, 1965, etc.)" (Gelfand & Hartmann, 1968).

Metz (1966), of the University of California and Camarillo State Hospital, illustrated the use of operant conditioning methods in the study and treatment of hospitalized, emotionally disturbed children. He first showed how the children were conditioned in groups to become more independent and engage in more socially acceptable behavior in connection with preparing to eat a meal. The specific procedure followed was: the children were conditioned to take poker chips and place them in a box before they could eat lunch, then they had to run their hand under water before they could get a chip, gradually the requirements were increased--before a poker chip could be obtained the child had to wash his hands with soap, dry his hands, and deposit the paper towel in the wastebasket. Finally, the chips and token box were eliminated so that the children could carry out the routine independently with a minimum of supervision. The overall effect of such training was "...to create a sense of order and a feeling of self-control in these disorganized children, provide them with socially and personally useful skills, create a more emotionally satisfactory atmosphere during each of these activities and free nursing personnel for more creative work with the children" (Metz, 1966).

Metz also spoke of using discriminative stimuli with autistic and schizophrenic children in an attempt to learn about their language competence and about their ability to process information. These children are extremely difficult to work with especially in a school setting. However, operant conditioning principles have been applied successfully. Simultaneous use of acceleration and deceleration modification techniques has been shown to be a powerful approach to the treatment of resistant and maladaptive behavior patterns, often exhibited by these children (Lovaas, Freitag, Gold & Kassorla, 1965). Lovaas, Schaeffer and Simmons (1965) showed an increase in social behavior in two 5-year-old identical twins diagnosed as childhood schizophrenics with autistic features subsequent to shock-escape training. Wolf, Risley, and Mees (1964) worked with a 3-year-old severely autistic boy to produce considerable positive behavior change through a combination of positive reinforcement (food) and a procedure described as "mild punishment" and extinction which involved isolating the child in his bedroom contingent upon his having had a temper tantrum. Extinction of bizarre and tantrum behaviors has been combined with social reinforcement for appropriate responses in a special classroom situation (Zimmerman & Zimmerman, 1962) while Marshall (1966) successfully toilet trained an 8-year-old autistic child using food reinforcement and mild punishment. Davison (1964) extinguished fear and aggressive responses, while he increased responsiveness to adult requests in a 9-year-old autistic girl through contingent application of candy, attention and opportunities to look into a mirror, and withdrawal of social reinforcement for undesirable behavior. Lovaas' (1966) exploratory studies on a 9-year-old echolalic girl indicated that use of food as reinforcement and withdrawal of food as punishment suppressed echolalic speech and established

more appropriate language behavior.

Simultaneous use of acceleration and deceleration techniques also seem to facilitate treatment of non-psychotic children's aggression (Gittelman, 1965; Sloane, Johnston & Bijou, 1968), school phobia (Lazarus, Davison & Polefka, 1965), encopresis in the school (Pedrini & Pedrini, 1971), operant crying (Hart, Allen, Buell, Harris & Wolf, 1964), and anorexia nervosa (Hallsten, 1965).

Metz (1966) discussed several possible misconceptions of operant conditioning. He emphasized that operant conditioning is more than the application of rewards and punishments to control behavior; discriminative stimuli as well as reinforcers must be included. He sees the behavior therapy process as "...an interaction between patient and therapist which leads step by step to an ever increasing ability of each to influence the other" (Metz, 1966). Rewards and punishments are not new concepts. They have been applied and are part of our primitive heritage, are part of our Judeo-Christian heritage, etc. But the scheduling, the modifications of the "how" it is done is much newer, more recent. Operant conditioning and learning has been applied in many, many areas of personal-social functioning.

There are many problems with regard to research. J. M. Gardner (1969) in reviewing some of the research in behavior modification and retardation reveals that there have been errors in design and methodology. He says that it is necessary to include: "(1) the exact specification of all relevant independent variables, (2) proper sampling techniques, (3) use of adequate control procedures, (4) proper assessment of the dependent variable, and (5) evaluation of long term gains."

Gelfand and Hartmann (1968), in their review article, also point

out the need for behavior therapy studies to meet the assessment standards of traditional research methodology. Unfortunately, there are few such studies regarding behavior therapy with children. However, they also indicate that "...in contrast to the play-therapy case-study literature, there are a small but growing number of carefully designed behavior-therapy case studies which meet most, if not all, of the suggested evaluation criteria and which convincingly demonstrate the power and efficiency of behavioristic treatment approaches (Allen et al., 1964; Doubros & Daniels, 1966; Harris et al., 1964; Whaler et al., 1965)." Thus, one is able to argue the merits of behavior therapy techniques on a theoretical basis; and as the "single organism, within subject" design (Gelfand & Hartmann, 1968) is applied, there will be more evidence of the method's effectiveness.

Other excellent review articles are by Cahoon (1968), Katkin and Murray (1968), O'Leary and Drabman (1971), and O'Leary, Poulos and Devine (1972). The O'Leary articles are especially applicable to classroom teaching.

One problem educators face today with research is the knowledge and information explosion. We need better standard journal and book control, e.g., extensive computer storage and retrieval.

Currently of great help in cumulating educational data are ERIC: RIE (1966 to the present) and ERIC: CIJE (1969 to the present). Psychological Abstracts and Education Index may be consulted directly, and need to be consulted for periods preceding ERIC.

NSSE (National Society for the Study of Education) has published yearbooks in the area of educational data and information since the

turn of the century. AERA (The American Educational Research Association) attempts to stimulate and focus upon pertinent studies. Of help are such AERA tomes as the Encyclopedia of Educational Research and the Handbook of Research on Teaching.

We need a research orientation in curriculum and education. Our teaching-learning should be grounded in experimental findings.

Skinner, in an interview with Evans (1968), has made specific suggestions for the improvement of our curriculum. He says that teaching machines are only one aspect of the whole technology of teaching, "... to effect a change you've got to arrange much better schedules of reinforcement than the teacher can possibly arrange where the student will be appropriately reinforced to shape his behavior progressively toward the goals of education." Skinner has written much (e.g., 1968, 1972) which is germane to the teaching-learning process.

And finally, as Martin (1972) said in discussing school critics of the 1950's and of the 1960's, teachers "...need people who are genuinely interested in helping them to resolve their everyday difficulties and frustrations and to develop new innovative programs." The areas of psychology and behavior shaping can be helpful and are strongly recommended.

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